

Application No. 10/064,888
Amendment dated: June 23, 2006
Reply to Office Action of April 5, 2006

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Amendments to the Drawings

Please replace drawing (FIG. 1), as originally filed with the replacement page 1/5 attached to the present Response.

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REMARKS/ARGUMENTS

In the Office Action dated April 5, 2006, the Examiner rejected claims 1 – 58. Claims 59 – 75 were previously withdrawn. In this response, claims 1, 4, 17, 33, and 36 are amended. No new matter has been added. Reconsideration and allowance of all pending claims are respectfully requested in light of the above amendments and in view of the arguments herein below.

Objections to drawings

The Examiner objected to Figure 1 as failing to comply with 37 CFR 1.84(p)(4) and 37 CFR 1.84(p)(5). Based on the Examiner's four objections, the following corrections are proposed: (1) In FIG.1, the reference character designating the sensor appearing above the power source 112 in the second plasma source 202 has been changed to 216. (2) The cascade plate 222 described in paragraph 35 of the specification has been included in FIG.1. (3) Paragraph 23 of the specification has been amended to insert the reference character ---120--- after the phrase "Flow of the plasma gas may be controlled by a flow controller". Paragraph 35 of the specification has been amended to include the phrase "a flow controller 220". The specification makes clear that the second plasma source 202 includes features corresponding to those of the first plasma source 102. Flow controller 120 is clearly a feature of the first plasma source 102, and flow controller 120 corresponds exactly to element 220 shown (but unlabeled) in the second plasma source 202. The Applicants urge therefore that in the amendments to paragraphs 23 and 35 no new matter has been added. (4) The anode in the first plasma source 102 was originally mislabeled 208, which corresponds to the anode of the second plasma source 202. The anode in the first plasma source 102 has been relabeled 108. Proposed changes (1), (2) and (4) to FIG. 1 are shown in the attached Replacement Sheet. Proposed changes (3) are reflected in the amendments to paragraphs 23 and 35 of the specification.

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Objections to disclosure

The disclosure was further objected to because there was no apparent discussion of the relevance of Figure 5, other than in the Brief Description of the Drawings section (paragraph 17). The Applicants have discovered upon review of the disclosure that paragraph 42 was intended to refer to Figure 5. Reference made to Figure 4 in paragraph 42 was inadvertent. Paragraph 42 of the specification has been amended to make reference to Figure 5. It is clear from context that original paragraph 42 refers to Figure 5 and not Figure 4. For example, paragraph 42 relates to "tuning" and "detuning" of plasmas produced by multiple plasma sources. Figure 5 makes express reference to the terms "Tuned" and "Detuned". Figure 4 makes no reference to the terms "Tuned" and "Detuned". Because the error was of a purely typographical nature, its correction should not be construed as introducing new matter.

Claim Rejections under 35 USC 112

The Examiner rejected claims 4 and 36 under 35 USC 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter because the claim did not end with a period. The Applicants thank the Examiner for pointing out this unintended oversight. In response, Claim 4 has been amended to depend from Claim 3 and Claim 36 has been amended to depend from Claim 35.

Claim Rejections under 35 USC 102 (b)

The Examiner rejected Claims 17-23, 26, 27, and 29-32 under 35 U.S.C. 102(b) as being anticipated by Bernecki (U.S. Patent 4,780,591). The Applicant courteously traverses these rejections.

Independent claim 17 has been amended to recite:

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A plasma source for generating a substantially controllable plasma comprising: a plasma chamber in which said substantially controllable plasma is generated; an anode disposed at a first end of said plasma chamber, said first end having an exit port through which said substantially controllable plasma exits said plasma chamber; at least one adjustable cathode disposed in said plasma chamber, wherein said at least one adjustable cathode is movable to establish a gap between said anode and said at least one adjustable cathode; a power source coupled to said anode and said at least one adjustable cathode for providing a voltage across said anode and said at least one adjustable cathode; a plasma gas inlet for introducing a plasma gas from a plasma gas source into said plasma chamber at a plasma gas flow rate; and at least one sensor for detecting and monitoring conditions within said plasma chamber, said sensor being integral to said plasma chamber.

FIG.1 and the written disclosure of the present application illustrate amply that the sensor 116 is integral to the plasma chamber. For example, FIG. 1 clearly shows sensor 116 in contact with and/or forming a part of plasma chambers 104 and 204. The disclosure at paragraph 28 elaborates on the close spatial and functional relationship between sensor 116 and plasma chamber 104:

At least one sensor 116 monitors and detects any change in such conditions within plasma chamber 104. The sensor(s) selected for use in plasma source 102 depends upon the property to be monitored. Non-limiting examples of the at least one sensor 116 that may be used monitor conditions within plasma chamber 104 include: a pressure sensor, such as a transducer, in fluid communication with plasma chamber 104; a voltmeter (or any similar voltage measurement device) for measuring and detecting cathode voltage; and an ammeter for measuring and detecting plasma current.

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FIG. 1 and paragraph 28 taken together provide, in one embodiment, a pressure sensor 116 in fluid communication with the plasma chamber 104. A pressure sensor in fluid communication with plasma chamber 104 requires that the sensor form a component of (i.e. be integral to) the plasma chamber. For example, a pressure transducer capable of measuring pressure conditions within the plasma chamber must be in contact with the contents of the plasma chamber in order to monitor the pressure within the plasma chamber. Such a pressure transducer is integral to the plasma chamber since it of necessity forms a part of the plasma chamber. Thus, the limitation "said sensor being integral to said plasma chamber" is both highly material and finds ample support in the written specification and FIG.1.

In stark contrast to the present invention, Bernecki teaches a plasma source comprising a sensor 148 which is remote from the plasma chamber 28, 63 (See Bernecki Figure 1(a)). The sensor 148 of Bernecki measures the voltage applied by the power supply across the anode and cathode, or across the arc power supply 23 or 223 but is not in any spatial relationship with the plasma chamber 28, 63. Instead, the sensor 148 is in contact with the arc power source 23 or arc voltage source 172. Therefore, Bernecki does not teach each and every limitation of independent Claim 17 and therefore cannot anticipate claim 17 and claims depending therefrom. Thus, the Applicants respectfully request that the rejection of claims 17-23, 26, 27 and 29-32 under 35 USC 102(b) as being anticipated by Bernecki be withdrawn.

Claim Rejections under 35 USC 103 (a)

(I) The Examiner rejected claims 24, 25 and 28 under 35 USC 103(a) as being unpatentable over Bernecki in view of Gasworth (U.S. Patent 5,204,145). The Applicants courteously traverse these rejections. The Applicants urge that, especially as amended, the claims of the instant invention recite subject matter patentable over the prior art. Gasworth discloses monitoring a pressure within a reaction chamber as opposed to a monitoring pressure within a plasma chamber. Gasworth does not disclose a sensor which is integral to the plasma chamber. Thus, a combination of Bernecki and Gasworth does not disclose all of the elements of the Applicants' claimed invention. Therefore, the

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Applicants respectfully request that the rejection of claims 24, 25 and 28 under 35 USC 103(a) as being unpatentable over Bernecki in view of Gasworth be withdrawn.

(II) The Examiner rejected claims 1-5, 8, 9, 11-14, 16, 33-42, 45, 46, 48-56 and 58 as being unpatentable over Bernecki in view of Okamura (U.S. Patent 6,267,074). The Applicant courteously traverses these rejections.

The Applicants urge that especially as amended, the claims of the present invention recite patentable subject matter and courteously request that the rejection of claims 1-5, 8, 9, 11-14, 16, 33-42, 45, 46, 48-56 and 58 as being unpatentable over Bernecki in view of Okamura be withdrawn.

In view of the foregoing, the Applicants respectfully request a prompt allowance of claims 1-58. Should the need arise, the Examiner is respectfully requested to contact the Applicant's representative at the telephone number listed below.

Respectfully submitted,


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